



Smart Sanitation and Food Safety

14 th CII Food Safety, Quality & Regulatory Summit

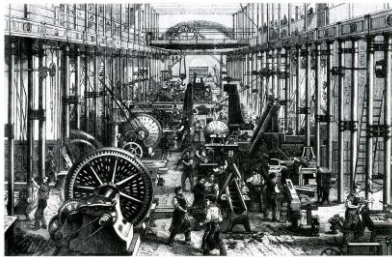
Subhajit Sinha

11th December 2019, New Delhi



Industrial Evolution

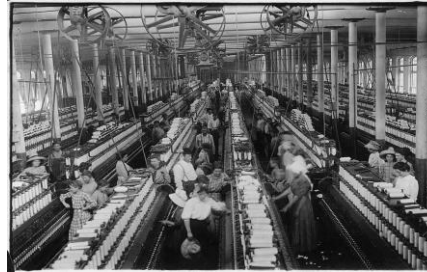
Level of Complexity



Driven by Mechanization,
water power, steam power

Industry 1.0

2nd half of the
18th century.



Driven by Mass production,
assembly lines, electricity

Industry 2.0

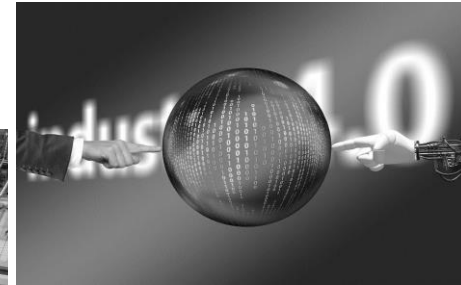
Beginning of the
20th century



Automated production driven
by robotics & electronics

Industry 3.0

Beginning of
1970s



Cyber-Physical Systems enabled
by AI, sensors, cloud computing

Industry 4.0

Now



What is digital...and why?

Digital, smart systems, services and the Internet of Things are driven by a combination of...

“Digital, IoT and Smart Systems”

in its simplest form, is a concept in which inputs—from sensors, machines, people, video streams, maps, newsfeeds, and more— are digitized and placed onto networks. These inputs are integrated into systems that connect people, devices, business processes, data and analytic tools to enable new customer value through collective awareness, enhanced productivity and services



SENSORS



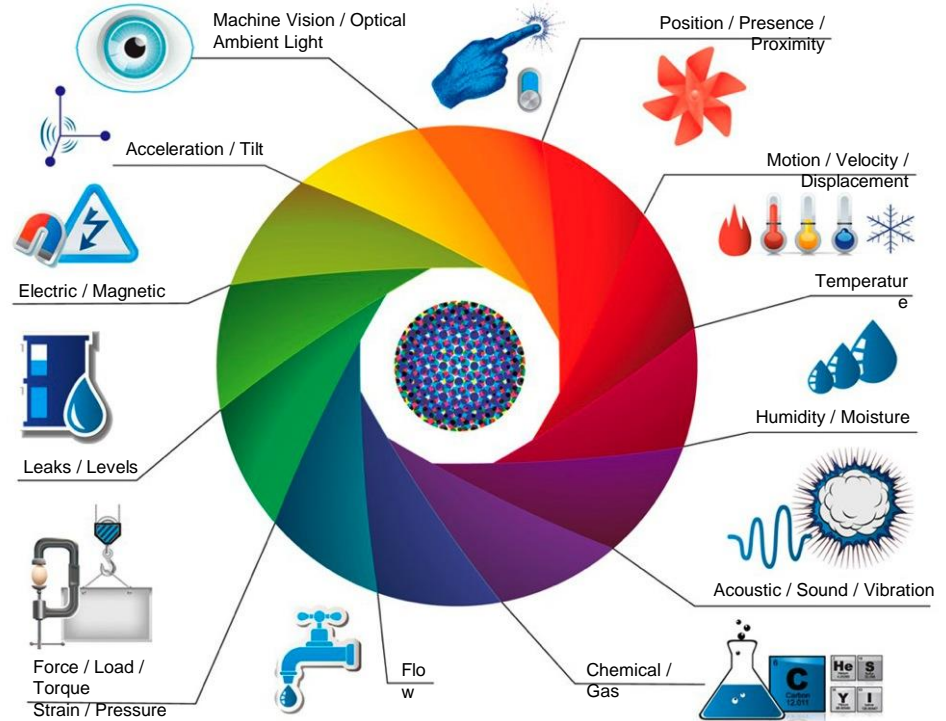
CONNECTIVITY



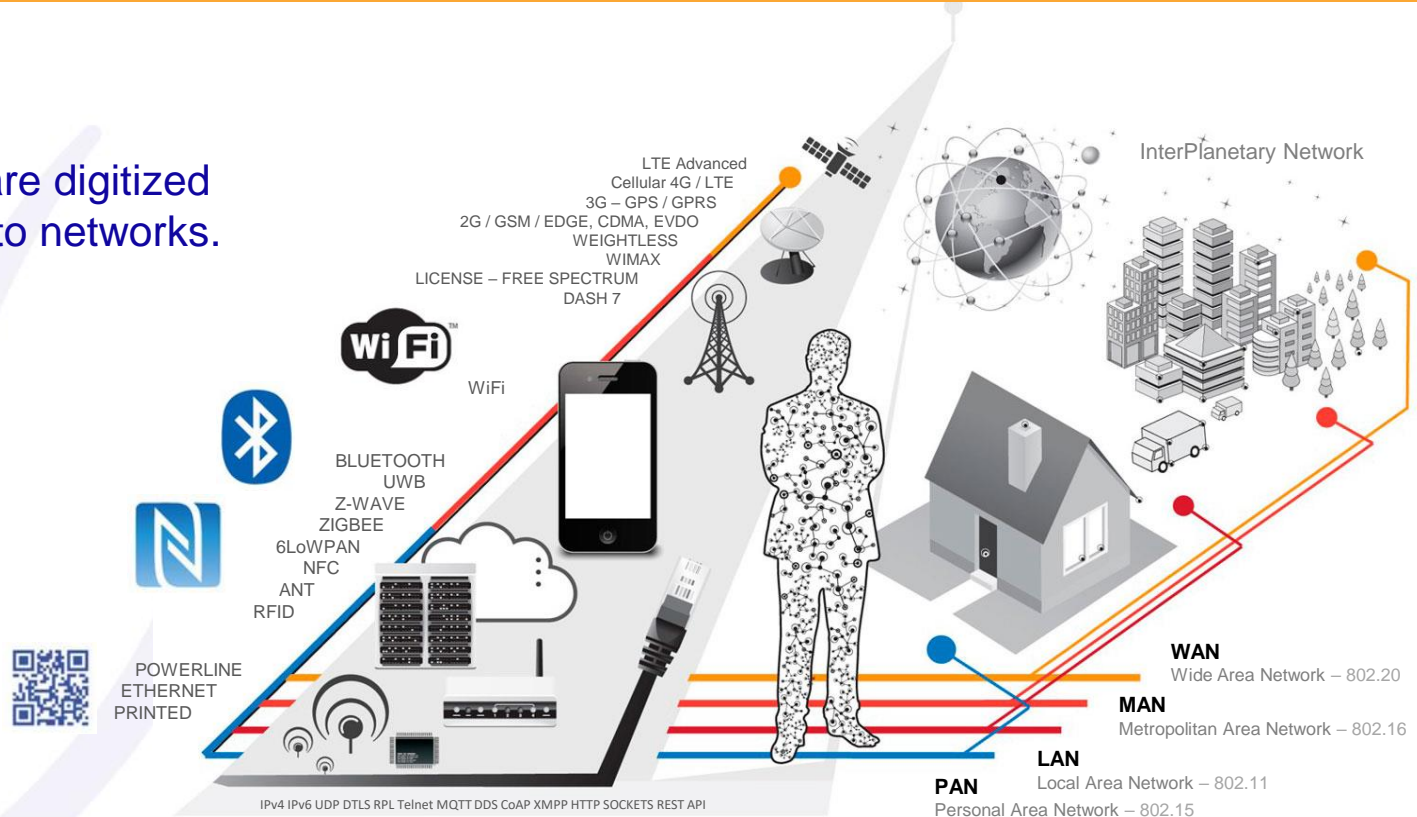
PEOPLE &
PROCESSES

We are giving our world a digital nervous system

Location data using GPS sensors. Eyes and ears using cameras and microphones, along with sensory organs that can measure everything from temperature to pressure changes.



These inputs are digitized and placed onto networks.

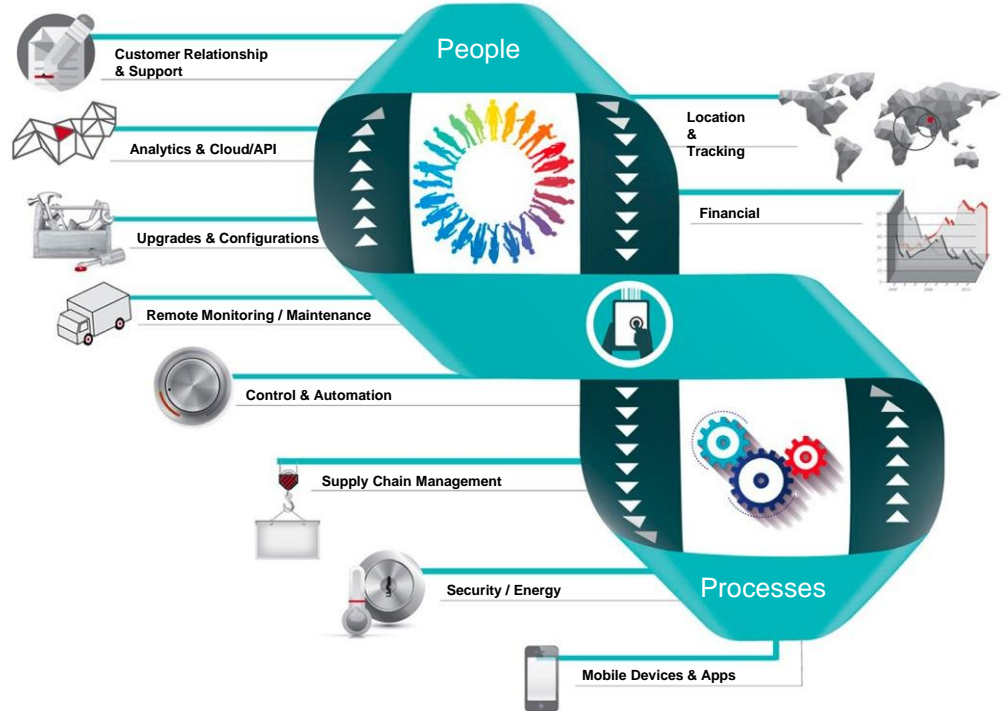




3

PEOPLE & PROCESSES

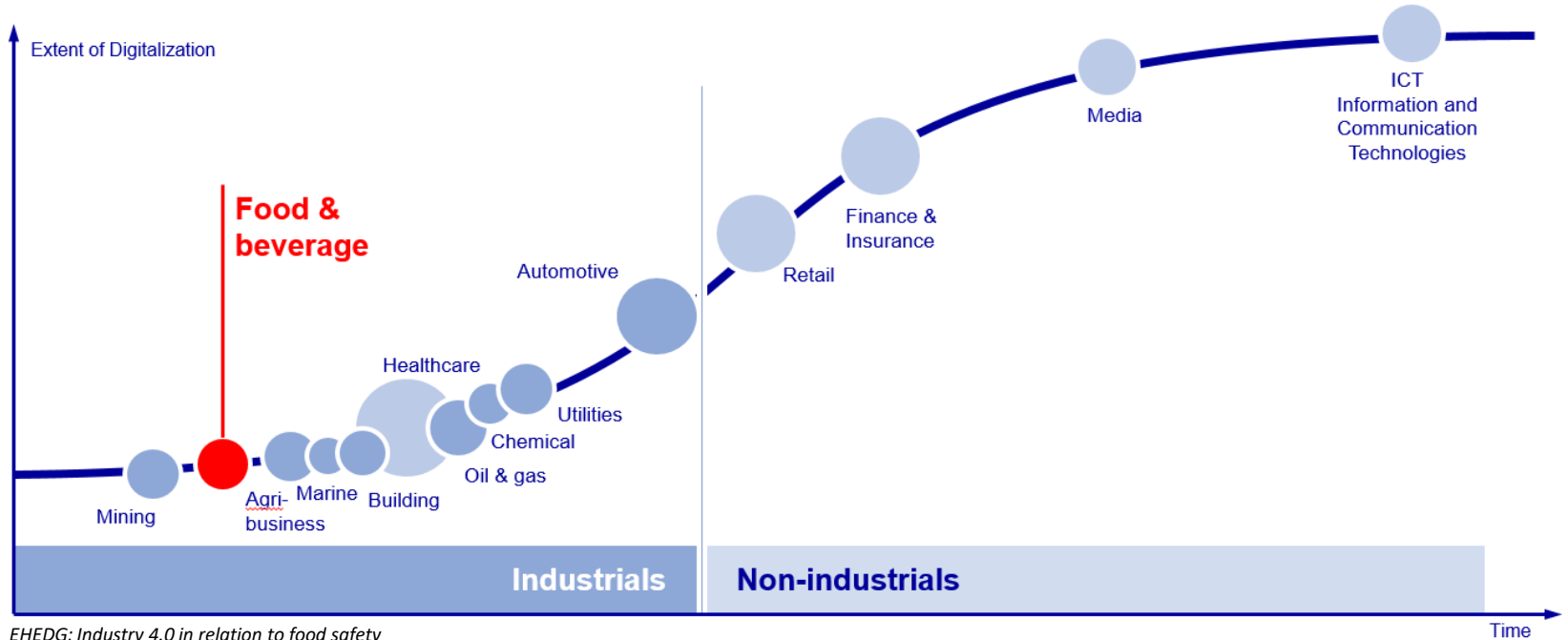
These networked inputs can then be combined into bi-directional systems that integrate data, people, processes and systems for better decision making.





Digitalization in different industries

Industrials typically late in adopting; F&B among latest to take off



EHEDG: Industry 4.0 in relation to food safety



Every year foodborne diseases cause:

almost
in 10
people to fall ill

33 million
healthy life years lost

Foodborne diseases can be deadly, especially in children <5

420,000
deaths

Children account for
1/3
of deaths from
foodborne diseases

Foodborne diseases are caused by types of:



Bacteria



Viruses



Parasites



Toxins



Chemicals



Benefits of Digital Technology to F&B Industry



**FOOD
SAFETY**

Enhanced Control over
Food Safety



**OPERATIONAL
EFFICIENCY**

Operational Excellence based
on Big data analysis



**SUPPLY
CHAIN**

Complex Supply Chain
Management enabled
through IT & Robotics



**QUALITY
ASSURANCE**

Improved Quality
Assurance with the help of
AI and Interconnected Systems



Real-time data to respond
to changing Business
needs and risk mitigation



The Cleaning Industry Megatrends

THE CHANGING WORLD IS IMPACTING OUR INDUSTRY



Regulatory



Eco-label



Health & Safety



Disease Control



Food Safety



Energy & Water



Internet of Things



Robotics

Increase of Hygiene Standards...

Increasing Needs for Food Safety...

Increase of Sustainability Standards...

Increase of Labor Scarcity...



The Cleaning Industry Megatrends

THE CHANGING WORLD IS IMPACTING OUR INDUSTRY

The Opportunity of Clean



Increased hygiene standards
\$226B cost of absenteeism



Increased food safety **1 in 6** food-poisoned in US



Increased healthcare compliance **\$40B** Hospital Acquired Infection (HAI) in US



Increased labor scarcity & Illiteracy
Up to **70%** turnover in BSC

“The Value of Clean” ISSA Survey

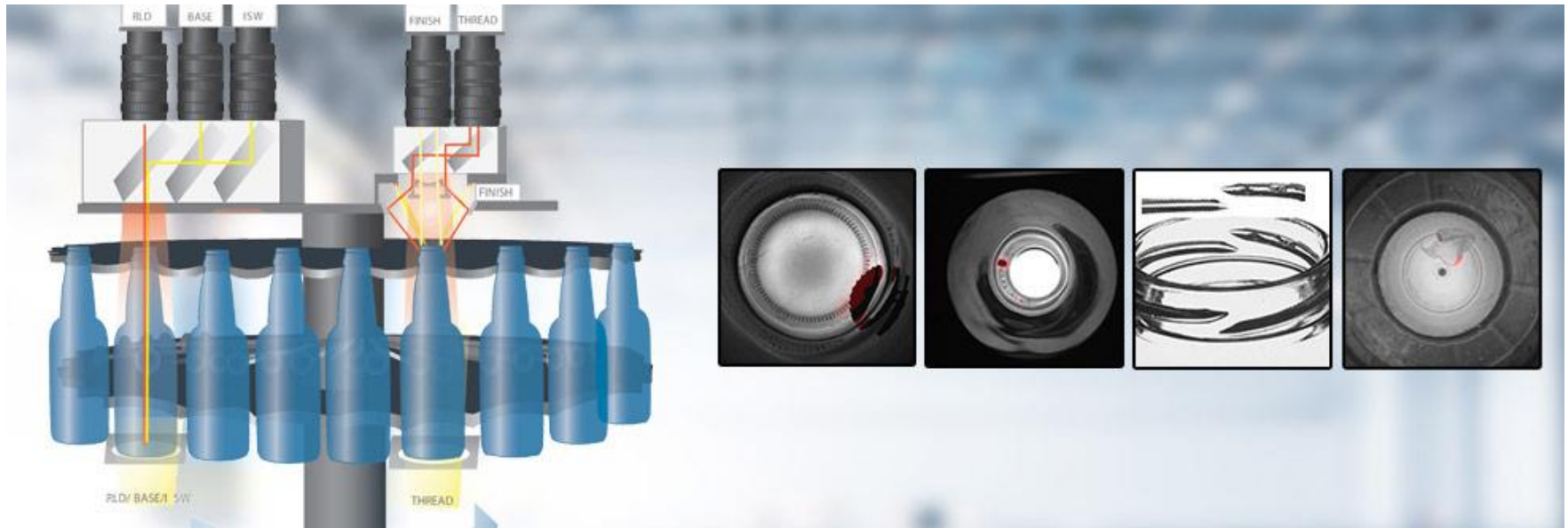
Reduced probability of catching cold or influenza	80%
Surfaces contaminated with viruses reduced	62%
Reduced absenteeism	46%
Productivity gain in a 100 employee office with an average salary of \$25k will lead to \$125k in savings	2% - 8%
Customers avoid a store if restrooms are not clean. 35% of those customers will not return.	50%





Example of Smart Cleaning in F&B Industry

Empty and Filled bottle Inspection Units: ASEBI and FBI



<https://www.filtex.com/product/empty-bottle-inspection-solution>

TASKI INTELLIBOT

Artificial Intelligence



PRODUCTIVITY / CONSISTENT RESULTS
REMOTE CONTROL / SOLVES LABOR SCARCITY

INTELLIGENT CIP TECHNOLOGY

WE ARE SURROUNDED BY DATA

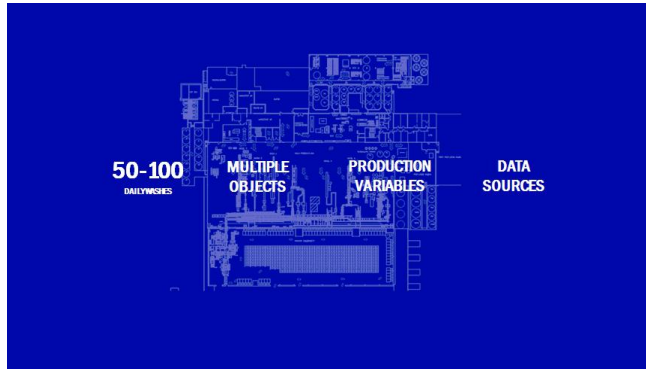


50-100 **PLANT OP OPERATIONS ARE** **DATA**
DAILY WASHES MULTIPLE OBJECTS PRODUCTION VARIABLES SOURCES
OVERWHELMED BY DATA



Challenges in CIP (Cleaning in Place)

TOO MUCH DATA



FEELING OF
OVER-CLEANING



UNFORESEEN
PROBLEMS





CIP CLEANS ARE CONTROLLED BY:

TEMPERATURE,

CONDUCTIVITY,

FLOW

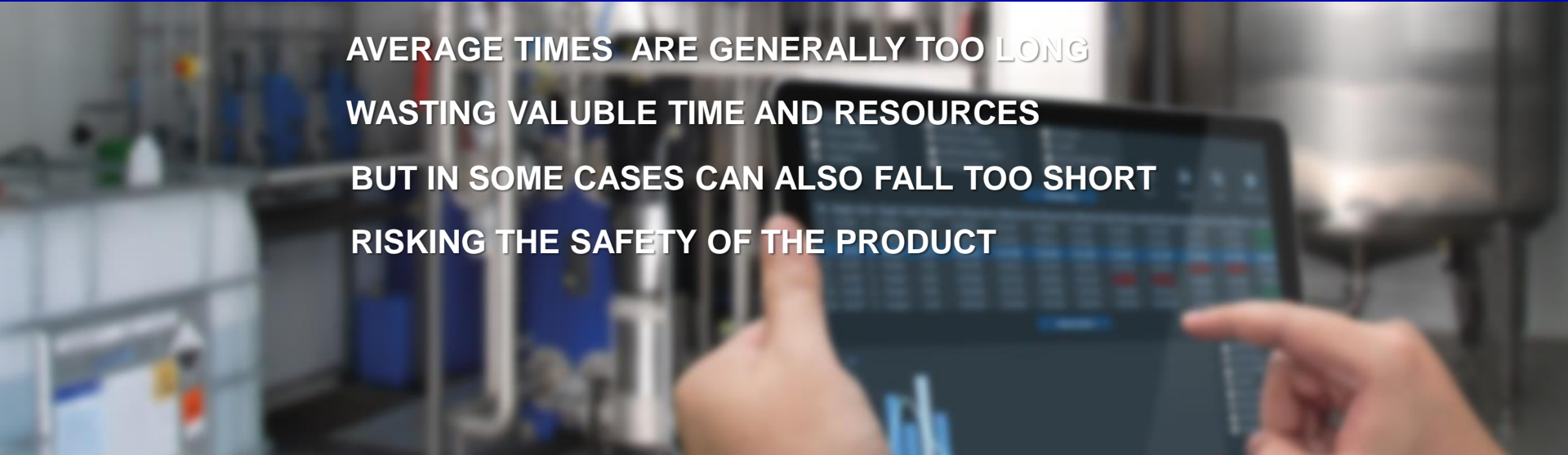
AND TIME



BUT WHEN THE CLEANING STARTS, WE PUT ON A BLINDFOLD!



**CIP CYCLE TIMES ARE BASED ON EMPIRICAL
AVERAGES**



**AVERAGE TIMES ARE GENERALLY TOO LONG
WASTING VALUABLE TIME AND RESOURCES
BUT IN SOME CASES CAN ALSO FALL TOO SHORT
RISKING THE SAFETY OF THE PRODUCT**



We need to ensure that the equipment is clean, everytime.

But we also need to ensure that we are not wasting valuable resources.



How does the technology work?

Spectrophotometer

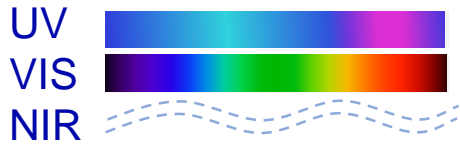
Measures soil in ppm levels





Spectrophotometric Sensors

Measures light inside CIP line.



Chemicals in rinses



Soil in liquids



Accuracy to 0.5 ppm

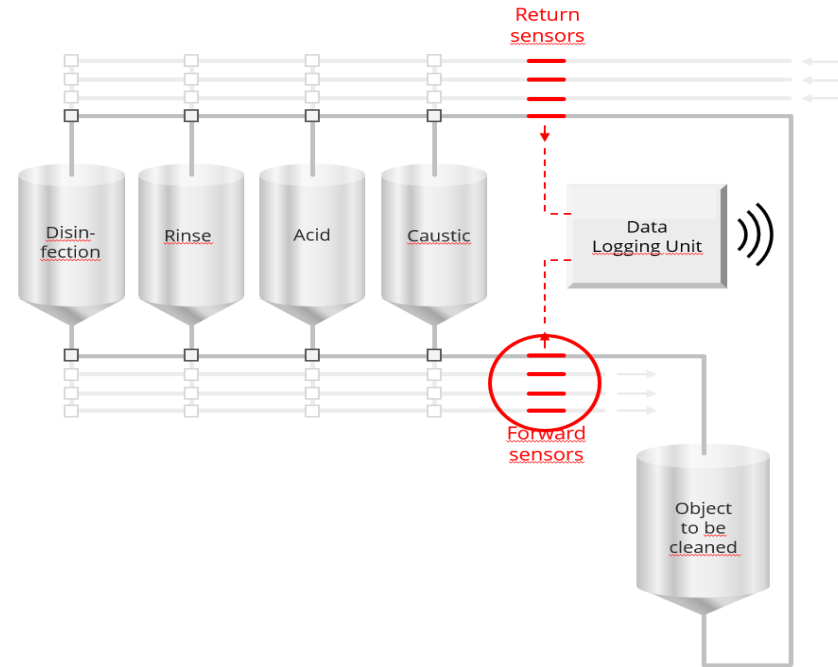




Data Collection

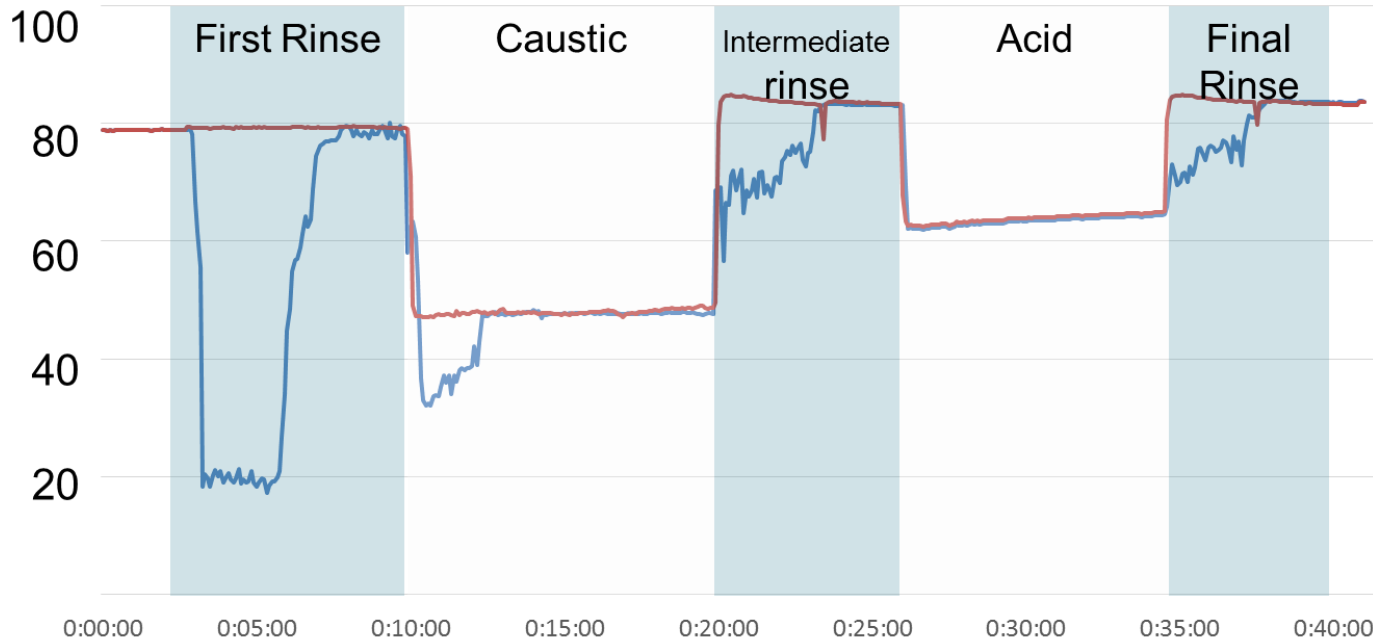
Forward and return sensors measure the soil in each line throughout the CIP clean.

This data can be plotted to accurately show the stages of the CIP clean.





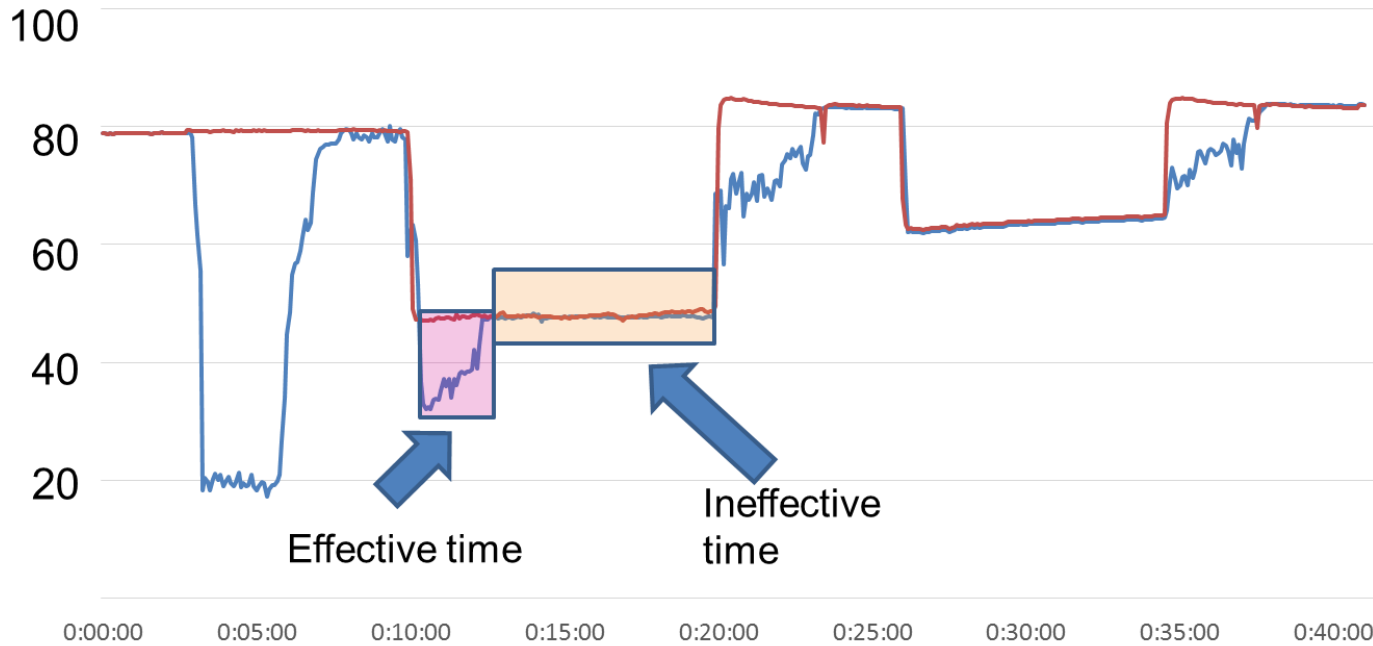
Data Interpretation



Example of Intake Pipe CIP Cleaning



Data Analysis

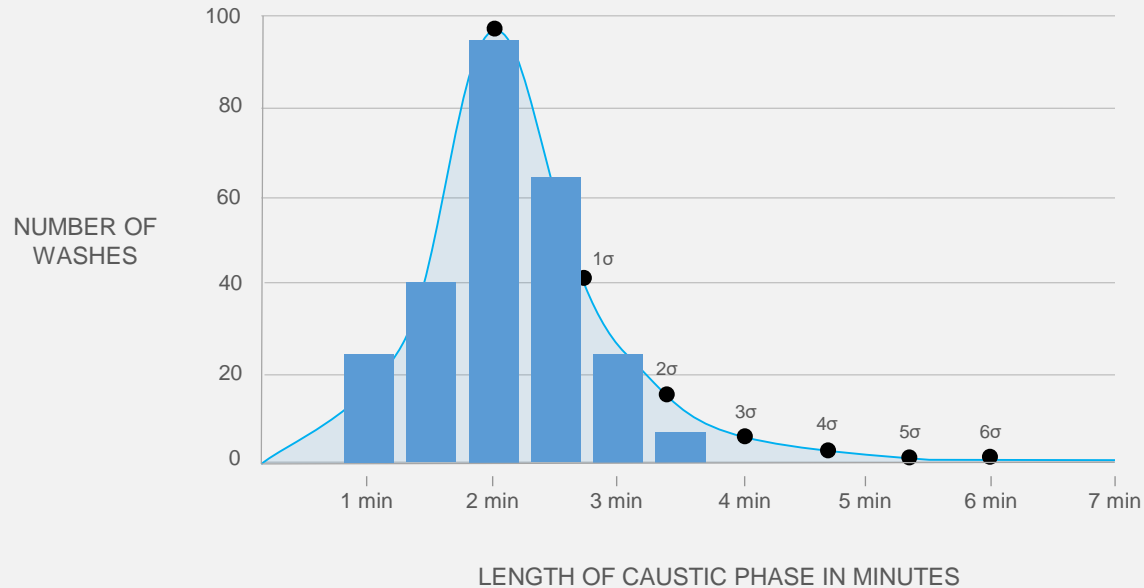


Example of Intake Pipe CIP Cleaning



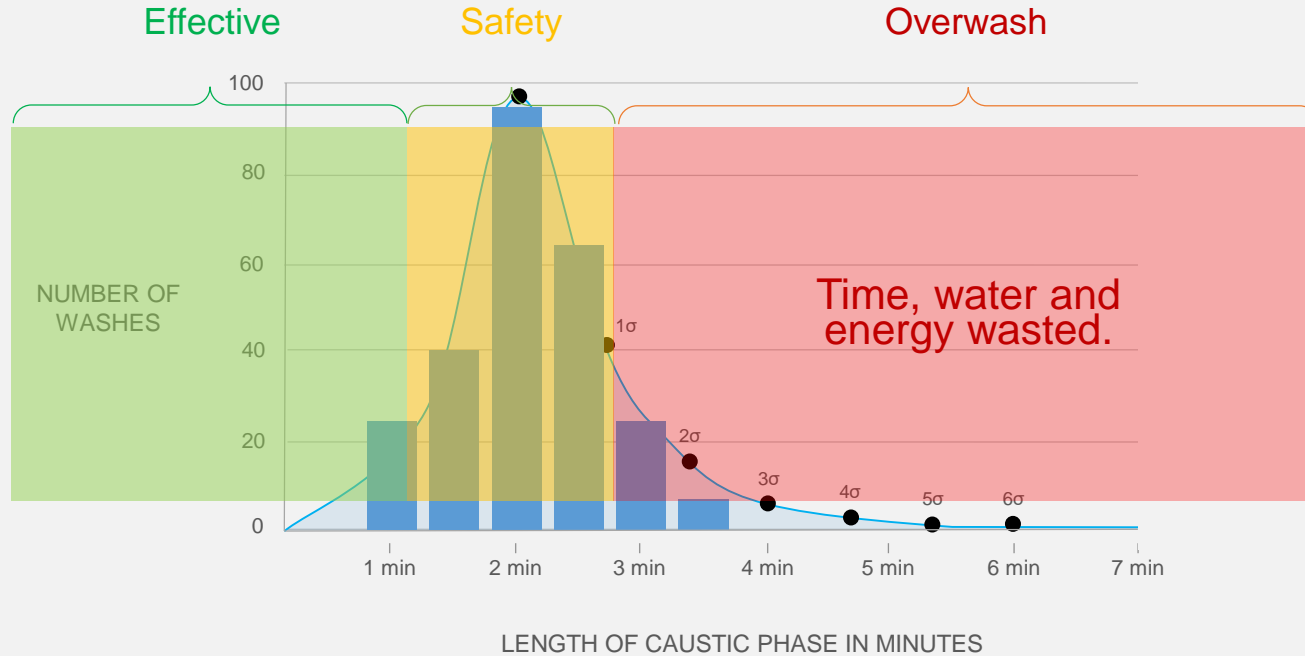
Data Analysis and Modelling

Data from multiple CIP runs to model the distribution of cleans





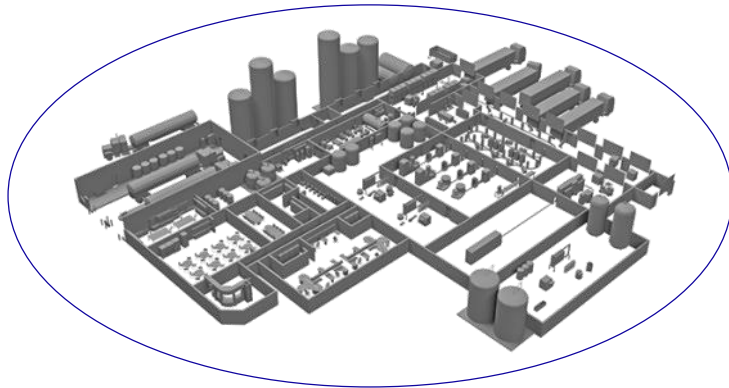
“Golden Curve” for Food Safety





Food Safety in the “Connected” Food and Beverage industry

Today, *and increasingly in the future*, **food and beverage processors measure key performance indicators (KPIs)** to be competitive, to run operations efficiently, to meet changing environmental demands and food safety standards, *and* to be responsible brand stewards.



System Integration, Robotics, Big Data, Data Analysis and AI offers the potential to monitor key parameters impacting Food Safety in real time and predict failures before they happen and can trigger corrective actions to prevent food safety incidences.

